CLAIMS

1. A valve system, comprising:

a valve comprising a valve stem linearly movable between a first closed position and a second, open position;

a first spring;

a second spring;

a first electromagnet assembly;

a second electromagnet assembly; and

a permanent magnet clapper affixed to the valve stem;

whereby the first spring is compressed and the valve is moved toward the first closed position as the permanent magnet approaches the first electromagnetic assembly, and whereby the second spring is compressed and the valve is moved toward the second open position as the permanent magnet approaches the second electromagnetic assembly.

2. The valve system of Claim 1, further comprising:

means for providing energy to at least one of the electromagnet assemblies to increase a local magnetic field.

3. The valve system of Claim 1, further comprising:

means for providing energy to at least one of the electromagnet assemblies to decrease a local magnetic field.

4. The valve system of Claim 1, further comprising:

means for providing energy to at least one of the electromagnet assemblies to attract the permanent magnet.

5. The valve system of Claim 1, further comprising:

means for providing energy to at least one of the electromagnets to repel the permanent magnet.

6. The valve system of Claim 1, further comprising:

means for repelling and attracting said clapper as needed to allow said valve to be opened and/or closed more quickly than a natural frequency of a spring mass combination would perform while still obtaining a soft landing.

7. The valve system of Claim 1, further comprising:

means for feedback control of valve motion to allow for compensation of friction, pressure forces, and other forces.

8. The valve system of Claim 1, further comprising:

means for energy recovery during deceleration of said valve.

9. The valve system of Claim 1, wherein overall power consumption is low because no power is required to hold said valve open or closed.

10. The valve system of Claim 1, further comprising:

means for storing energy recovered from at least one of the electromagnet assemblies.

11. The valve system of Claim 1, wherein the permanent magnet comprises neodymium.

12. The valve system of Claim 1, wherein the permanent magnet comprises samarium cobalt.

13. The valve system of Claim 1, wherein said first spring is isolated from said valve at the first closed position, and wherein said second spring is isolated from said valve at the second open position.

14. A valve system, comprising:

a valve assembly linearly movable between a closed position and an open position;

a valve spring which is compressed by the valve assembly when the valve assembly is located in the open position, and is uncompressed when the valve assembly is located in the closed position;

a disable spring which is compressed by the valve assembly when the valve assembly is located in the closed position, and is uncompressed when the valve assembly is located in the open position;

a first electromagnet and a second electromagnet;

a first permanent magnet located proximate to the first electromagnet;

a second permanent magnet located proximate to the second electromagnet; and

a clapper affixed to the valve assembly, such that the clapper moves between the first electromagnet and the second electromagnet.

15. The valve system of Claim 14, further comprising:

means for providing energy to at least one of the electromagnets to increase a local magnetic field.

16. The valve system of Claim 14, further comprising:

means for providing energy to at least one of the electromagnets to decrease a local magnetic field.

17. The valve system of Claim 14, further comprising:

means for providing energy to at least one of the electromagnets to attract the clapper.

18. The valve system of Claim 14, further comprising:

means for providing energy to at least one of the electromagnets to repel the clapper, when said clapper comprises a permanent magnet.

19. The valve system of Claim 14, further comprising:

means for storing energy recovered from at least one of the electromagnets.

20. The valve system of Claim 14, wherein the permanent magnet comprises neodymium.

21. The valve system of Claim 14, wherein the permanent magnet comprises samarium cobalt.

22. The valve system of Claim 14, wherein the valve spring is isolated from the valve at the closed position, and wherein the disable spring is isolated from the valve at the open position.

23. A valve system, comprising:

a valve assembly linearly movable between a closed position and an open position;

a valve spring which is compressed by the valve assembly when the valve assembly is located in the open position, and is uncompressed when the valve assembly is located in the closed position;

a disable spring which is compressed by the valve assembly when the valve assembly is located in the closed position, and is uncompressed when the valve assembly is located in the open position;

at least one electromagnet;

at least one permanent magnet; and

a clapper affixed to the valve assembly and movable in relation to the electromagnet and the permanent magnet.

24. The valve system of Claim 23, further comprising:

means for providing energy to at least one of the electromagnets to increase a local magnetic field.

25. The valve system of Claim 23, further comprising:

means for providing energy to at least one of the electromagnets to decrease a local magnetic field.

26. The valve system of Claim 23, further comprising:

means for providing energy to at least one of the electromagnets to attract the clapper.

27. The valve system of Claim 23, further comprising:

means for providing energy to at least one of the electromagnets to repel the clapper, wherein said clapper comprises a permanent magnet.

28. The valve system of Claim 23, further comprising:

means for storing energy recovered from at least one of the electromagnets.

29. The valve system of Claim 23, wherein the permanent magnet comprises neodymium.

30. The valve system of Claim 23, wherein the permanent magnet comprises samarium cobalt.

31. The valve system of Claim 23, wherein the valve spring is isolated from the valve at the closed position, and wherein the disable spring is isolated from the valve at the open position.

32. The valve system of Claim 23, wherein energy is returned to a power source by use of regenerative breaking of said clapper.

33. The valve system of Claim 23, wherein both a north pole of said permanent magnet and a south pole of said permanent magnet are used to attract or repel said electromagnet.

34. The valve system of Claim 23, further comprising:

a software module for at least partially controlling a soft landing and optionally for reducing power consumption.

35. The valve system of Claim 23, further comprising:

means to open said valve partially and close it again.

36. The valve system ofClaim 23, wherein the valve spring and the disable spring each have a different rate of compression.

37. The valve system of Claim 23, further comprising:

an electromagnet core.

38. The valve system of Claim 37, wherein said core is formed as a laminated structure.

39. The valve system of Claim 37, wherein said clapper is formed as a spiral laminate structure.

40. The valve system of Claim 23, wherein the valve spring and the disable spring have different lengths.

41. The valve system of Claim 23, wherein the valve spring and the disable spring have different masses.